

In response to the Examiner's rejection of claims 30 and 32 under 35 U.S.C. 112, second paragraph, Applicants have amended each of these claims. Withdrawal of the rejection is now in order.

Claims 40, 44, 45 and 46 stand rejected due to the presence of the expression “and/or”. Applicants have amended claims 40 and 44 to eliminate this expression and claims 45 and 46 have been canceled. Withdrawal of this rejection is in order in view of the present amendments. In addition, as a result of these changes, Applicants have added a set of new claims to capture all of the subject matter presented in original claims 40, 44, 45 and 46.

Claims 26-33, 35, 37, 39, 41 and 42 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 5,309,085 to Sohn. Claims 34, 36, 40 and 43-48 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn and further in view of Thewes (WO 01/75462). Applicants respectfully traverse these rejections for the following reasons.

Before discussing the above rejections in detail, Applicants believe that a brief discussion of the present invention is in order and will assist the Examiner in appreciating the differences between the present invention and the disclosures of the prior art references.

The present invention is based on the problem of providing an electronic multi-electrode array in which, even in the event of an alteration or a deviation of the value of a physical parameter of a sensor element from a reference value, i.e. a value of the physical parameter that occurs under normal, preferably predetermined, process conditions, a sensor signal generated by the sensor element is independent of the alteration of the value. This problem is resolved by means of the circuit arrangement, the sensor array and the biosensor array as specified in the present patent application. A key element of the present invention is that it can be used to at least partly compensate for an alteration of the value of the physical parameter of the sensor element, said physical parameter being the threshold voltage of a measuring transistor.

The prior art document of Sohn (U.S. Patent No. 5,309,085; henceforth Sohn) teaches a measuring circuit using a biosensor which comprises two ion sensitive field effect transistor

(ISFET) input devices and a differential amplifier 50 for amplifying the outputs of the two ISFETs. A first ISFET, referred to as ENFET 10, comprises an ion sensitive membrane 4 which is formed on the gate and the circumference of a metal contact 3 (which acts as a source or drain terminal of the ISFET), and an enzyme sensitive membrane 1 which is formed over the ion sensitive membrane. The second ISFET, referred to as reference FET or REFET 20, differs from the ENFET in having no enzyme sensitive membrane. When the biosensor is soaked in a solution of a specific biomaterial or substrate S, the enzyme sensitive membrane 1 of the ENFET 10 reacts upon the specific biomaterial in the solution resulting in a signal from the ENFET 10 which depends on the concentration of the biomaterial in the solution. On the other hand, since the REFET 20 has no enzyme sensitive membrane, the signal detected from the REFET 20 is independent of the substrate concentration. In addition, a quasi-reference electrode (QRE), made of Pt or Au, acts as a reference electrode having a non-stable performance in the solution. The output voltage of the ENFET with enzyme sensitive membrane is a function of the substrate concentration pS and the non-stable potential V_q of the solution due to the use of QRE. On the other hand, the output voltage of the REFET which is not responsive to pS is a function of V_q only. A final voltage, which is a function of pS only, is obtained by applying the output voltages of the ENFET and the REFET to a differential amplifying circuit.

In the outstanding Office Action, the Examiner equates the claimed sensor element of the present patent application to the element 30 in the Sohn reference (shown in Fig. 3) and states that this sensor element has an electrode 3 that is coupled to a substance to be examined. However, the element 30, which is not specifically identified in the specification of Sohn, is merely the quasi-reference electrode QRE which is connected to a power supply and is placed in the solution. Thus, element 30 clearly cannot be identified with the claimed sensor element having an electrically conductive sensor electrode and a measuring transistor (see e.g., pending claim 26 of the present patent application). Furthermore, reference numeral 3 in the Sohn reference denotes the metal contacts on the source/drain regions of the ISFET (see Fig. 1) which are not coupled to a substance to be measured, but rather are electrically insulated by an electrical insulating material 2 (see Fig. 1). Thus, it is unclear as to what the Examiner is referring to as the sensing element. The Examiner

